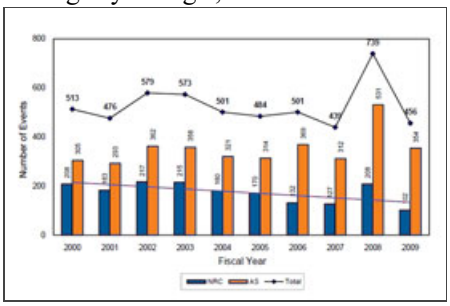
INL employees have developed the Nuclear Material Events Database (NMED) to help the Nuclear Regulatory Commission keep track of nuclear materials that aren't associated with reactors.

Tracking the trends: The Nuclear Material Events Database

By Brianna McNall, *Nuclear Science & Technology intern*

Spikes on graphs can make analysts cheer – if they indicate increased sales at retail outlets, for instance. But when the line on a graph is tracking problems with nuclear materials, it can cause concern.

That's why eyebrows went up when the 2008 report of the Nuclear Material Events Database (NMED) showed a 272-event spike. It ended up being pretty harmless — just a major nationwide retailer, taking a long overdue inventory of its stores' emergency exit signs, which can contain a weak radioactive material.



INL's database first noticed a 2008 spike from a nationwide retailer's inventory of store emergency exit signs, which can contain a weak radioactive material.

Anything containing radioactive materials has to be licensed with the Nuclear Regulatory Commission. The agency keeps track of nuclear materials both large and small — a daunting job considering the numerous radioactive sources used all over the country. But a team of five employees at Idaho National Laboratory is making it a little easier. The team developed NMED, a program used to track nonreactor nuclear "events" – anything from lost or stolen sources to incorrect radioactive medical procedures.

So when the nationwide retailer's numbers started coming in, they didn't get past the INL team.

"We noticed it first," said Dante Huntsman, the team's technical lead.

They reported the higher numbers to NRC's Washington, D.C., offices before anyone else noticed the spike and panicked. It won't be the last big spike. Other companies are now being asked to check their inventories of radioactive exit signs as well.

Engineer Tom Smith has been with INL since 1989, barring a brief period working at New York's Nine Mile Point Nuclear Station. Now, he's heading the team working on NMED.

In 1974, the NRC took over the regulation of radioactive materials. Licenses for nuclear power plants, inventories of nuclear materials and records of any materials that can't be located go through the NRC.

While the NRC is the only agency that can regulate the use of nuclear reactors and reactor materials, many states are taking over the licensing and tracking of nonreactor nuclear materials. Radioactive substances are used in everything from university research to health care to hydrocarbon mining. So long as states ensure that they can regulate the materials as firmly as the NRC, the federal agency yields jurisdiction to the state.

NMED tracks nonreactor nuclear materials, such as substances used in university research, health care, hydrocarbon mining and building exit

"The states are almost autonomous," Smith said. Currently, there are 37 of these "agreement states," with more working through the approval process.

In order to keep licensing local sources, agreement states have to keep strict watch over radioactive materials. Sometimes sources are lost, or stolen. There are even times when a source is too difficult to recover, and is then abandoned. A specific section of U.S. Code deals with the proper abandonment of sources used to "log" or explore new petroleum wells.

"All this information has to funnel up to the NRC, and the NRC funnels it to Congress," Smith said, although he couldn't say exactly how much information made it that far. "Following immediate notifications to the NRC, agreement states send follow-up information directly to INL."

The information is plugged into NMED, where the team at INL can perform statistical analyses, track "abnormal occurrences" and watch for trends that the NRC should investigate.

signs. Photo: flickr/griffithchris

The database has more than 20,000 documented events. But the entries aren't usually one-time work.

"I'll get the reports, and then investigate them," said Huntsman. "I receive all the various reports from the agreement states and the NRC."

"We have been doing this type of NRC support work since about 1987," Smith said. "This particular project has been going since 1993."

"These are long-term projects, and that's one of our strengths," he added. "We're not changing people out every two years."

The NMED team produces quarterly and annual reports for the agreement states and the NRC. The annual reports are available for several years on the Web. They list a quick executive summary of events, and include statistical data and detailed accounts of what events occurred and what actions were taken to prevent them from occurring again.

"A shipping company lost a 55-gallon drum full of 100 Americium sources," Smith said. When the manufacturer who had been expecting the shipment called, the company claimed that the sources had been delivered.

"They said 'Joe Schmoe' signed for them, and the company said, 'We don't have a Joe Schmoe working here,'" Smith said. The FBI and several local agencies were called in, but the shipping company discovered the drum in one of its warehouses.

The Americium sources by themselves were small, but the loss of so many together qualified as a "Category 3 Source Event."

Nuclear material events are categorized by numbers from one to eight, with Category 1 involving the strongest sources. Lost materials, medical incidents and different category events are analyzed, but the report also includes a 10-year look at overall NMED numbers.

If you do decide to check out the annual report, remember not to be alarmed when you see the spike in events for 2008. It's just the retailer, and its radioactive exit signs.

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